Guidelines for Approving Managed Point-of-Use or Point-Of-Entry Treatment in Idaho Public Water Systems

Idaho Department of Environmental Quality
July 2003

Table of Contents

This page intentionally left blank.

Introduction

Point-of-Use (POU) devices treat water at a single tap. Point-Of-Entry (POE) devices treat water at the entrance to a home or other service connection. The 1996 Amendments to the Safe Drinking Water Act (SDWA) removed a long-standing prohibition on the use of these treatment methods for compliance with certain national drinking water standards. Idaho modified its regulations in 1999 to be consistent with the SDWA provisions.

All of the water within a facility served by POE treatment is suitable for drinking and cooking (although irrigation flows and other high-volume uses may be excluded from treatment using plumbing by-passes). However, because of cost and waste disposal issues, EPA does not consider POE treatment to be broadly acceptable for small systems at the present time.

To clarify: The SDWA allows POE and POU, but EPA's Compliance Technology List (see references at the end of these guidelines) excludes POE in small system applications for the reasons listed in the preceding paragraph. The technology list does not carry the weight of regulation, so states are free to consider POE applications. In general, Idaho follows EPA's lead on these matters because DEQ lacks the staff to conduct evaluations of POE installations to weigh costs and benefits. In some situations, such as small transient systems (see page 8 of these Guidelines), POE may make better operational and economic sense than POU. In these situations, the cost and waste management issues will be a deciding factor.

In some situations, the distinction between POE and central treatment becomes blurred. As a rule of thumb, central treatment is applied to all water produced by the system, whereas POE applications do not treat water used for irrigation or other non-potable purposes.

These guidelines deal primarily with POU applications.

POU treatment may be a safe and practical application for small systems under some circumstances, but there are two major concerns that must be addressed:

1) the treatment device is located on private property (usually in a home or business), which restricts the timing and convenience of access by the water system for the purpose of servicing the units.

2) not all water taps are treated to drinking water standards and the water system cannot prevent individuals from ingesting untreated water.

The 1996 SDWA attempts to address these concerns by requiring the public water system to be responsible for ownership and maintenance of the POU devices and by requiring that the devices be equipped with an alarm to notify customers of the need for maintenance or repairs.

These guidelines will provide technical background on POU treatment and offer guidance for DEQ engineers who are called upon to approve POU applications in Idaho public water systems. Water systems and their consultants should find information here to aid in preparing an engineering study. The U.S. Environmental Protection Agency has recently developed guidance on POU/POE applications that may be used in conjunction with these guidelines (see references on page 21). It should be noted that POU technologies capable of safely and reliably treating drinking water are available and well proven. For this reason, it is unlikely that the technical aspects of a POU application will be unusually challenging. **The primary burdens on water systems and engineering consultants will be first, to make it clear to DEQ that conventional, centralized treatment is not feasible technically and/or financially, and second, to demonstrate with certainty that a management structure is in place to service and maintain the treatment equipment and monitor for compliance.** The normally passive role of the customer must be altered in order for POU treatment to succeed. The homeowner or business person must become an active and willing partner with the water system. This involves legal as well as educational arrangements. Managerial issues will constitute a primary focus of this document and will no doubt pose the foremost challenge to successful use of these treatment technologies.

DEQ will revise these guidelines when significant changes occur in technologies, accepted practices, or regulations. Before using this document, please check with DEQ's drinking water program to ensure that you have the most current version.

Section 1. Regulatory Background and General Requirements

Regulatory Background

A public water system is responsible for delivering water that meets national drinking water standards to all of its customers. To obtain DEQ approval for POU treatment, it will be necessary for the water system to have written permission from all of its customers to allow water system personnel to enter private premises on a scheduled basis to install, maintain, or replace the POU units, and for the purpose of collecting compliance samples.

The SDWA states that " . . .point-of-use treatment units shall be owned, controlled, and maintained by the public water system or by a person under contract with the public water system to ensure proper operation and maintenance [O & M] and compliance with the maximum contaminant level or treatment technique." The use of POU treatment "to achieve compliance with a maximum contaminant level or treatment technique required for a microbial contaminant (or an indicator of a microbial contaminant)" is explicitly forbidden. Each treatment unit must be equipped with an alarm which alerts the customer to the fact that the unit is in need of attention and may not be producing safe water. Lastly, POU units must be independently certified according to any existing standards promulgated by the American National Standards Institute. Information is provided in Section 2 on alarms and on national standards that apply to POU devices.

General Requirements—Protocol for Submission and Approval

The following elements must be addressed in plan and specification submittals involving POU treatment:

1. **DEQ will only consider approving POU treatment upon receipt of an analysis that clearly demonstrates that central treatment is not feasible for the water system.** Central treatment is preferable to POU for safety and liability reasons. Unless waived by DEQ, this analysis must be in the form of an engineering report prepared by a professional engineer registered in the State of Idaho.

2. **Each water system customer must sign an access agreement that allows water system personnel to enter their property on a scheduled basis to install and maintain the treatment devices.** The agreement should include a statement that the homeowner assumes responsibility for instructing family members or other residents that they should not cook with or ingest water from untreated taps. The water system must provide its customers with educational materials concerning the health risks associated with the contaminant(s) for which treatment is proposed. DEQ can provide basic health related information for the contaminants most likely to generate interest in POU treatment in Idaho. A termination of service clause/ordinance must be legally adopted by community systems in order to deal with uncooperative customers. In homeowner's

associations, the access agreement and other informational materials associated with the community's water treatment strategy must be disclosed to all potential buyers so that cooperation by incoming residents who were not part of the original deliberative process may be assured.

3. **A pilot study may be required, particularly if multiple treatment units are planned, in order to determine the suitability of the POU device for treating the system's source water.** The scope and duration of the pilot study will be determined by such factors as the characteristics of the raw water, manufacturer's ratings of the treatment device, and good engineering practices. The pilot study will generate data on service intervals, aid in specifying and calibrating alarm systems, and reveal any site specific problems with component fouling or microbial colonization.

4. **The system must provide an operations and maintenance plan demonstrating that the POU treatment units will be serviced in accordance with the manufacturer's instructions and that compliance sampling will take place, as required by DEQ.** Required service intervals will be determined initially by the pilot study or by following manufacturer's recommendations. The maintenance schedule can later be adjusted to reflect actual experience.

5. **The alarm mechanism that will be used must be specified in the engineering report.** See Section 2 for technical details.

Types of Water Systems

POU treatment may be more appropriate for some types of water systems than it is for others. The following discussion conveys DEQ's assessment of how POU applications should be approached in various system types. **In each case, the approval process will be in two parts. The first part is the system's justification, usually prepared by an Engineer. The second part is DEQ's staff analysis describing the agency's rationale for approving POU. Both parts must be carefully documented in the system file.**

As a general principle, DEQ will resist POU applications in new systems. It is felt that with proper attention to well siting and construction it should be possible to avoid tapping contaminated waters that will require treatment. If uncontaminated waters are not available, POU will be considered on the same terms as existing systems.

There are three categories of water systems with differing operating environments that can effect the suitability of various treatment options.

1. Transient systems: Included here are small bars and roadside stores or restaurants. Nitrate is the only non-microbial contaminant presently of regulatory interest to this group of systems. Because nitrate is an acute contaminant, POE treatment is preferred and, in small systems, may be functionally equivalent to central treatment. POE applications for compliance with the nitrate MCL must exclude irrigation flows, waste disposal must be effectively managed, and it may be necessary to provide further

treatment to reduce corrosion potential. **POU for nitrate compliance will only be considered if treatment is provided at all taps that are available to the public.** POU is acceptable for voluntary (non-regulatory) treatment of chronic contaminants. In this environment, it is likely that the owner/operator of the system will service and maintain the treatment units. DEQ may consider plans and specifications prepared by a vendor. All water intended for public consumption, including ice and mixed beverages, should be treated.

2. Community systems: POU treatment may be challenging in terms of access for repair or maintenance, particularly in the increasingly common circumstance where a subdivision is made up of recreational or part-time homes that are often unoccupied. Homeowner organizations may also lack police powers to aid in enforcing access and other forms of cooperation. If POU is allowed, DEQ will expect a clear demonstration of universal homeowner support (see item 2 under general requirements, above). In community systems with more than about seventy service connections, POU can be an acceptable strategy when only a few homes require treatment, or when treatment of large volume of irrigation water is cost prohibitive. As previously stated, DEQ will require a feasibility study demonstrating the financial and practical advantage of POU over centralized treatment. **POU treatment for compliance with the nitrate MCL will not be allowed in these systems.**

3. Non-Transient Non-Community Systems: POU may be a reasonable option for vegetable packing sheds, industrial plants, and other facilities with a large differential between potable and other water uses. Schools and day care centers may also qualify, although in each of these situations multiple taps may require treatment and costs of POU could quickly become comparable to central treatment. Rigorous attention must be given to the separation of potable and non-potable water systems and provision of an ongoing cross-connection control program. **POU for compliance with the nitrate MCL will only be considered if treatment is provided at all taps that are accessible to the public.**

This page intentionally left blank.

Section 2. Technical Considerations

This Section is based on sources that are reasonably current. However, technology continues to evolve, and periodic revisions of this information will no doubt be required.

Characterization of Source Water

The raw water to be treated must be characterized as appropriate for the technology being considered. Manufacturers will ordinarily specify raw water characteristics for which their equipment is suited, and this information may be used to determine the scope of raw water chemistry studies. As a minimum, inorganic constituents, including total dissolved solids (TDS) and pH, must be reported. If significant seasonal variations are suspected or known, a sampling scheme may need to be developed in order to capture the range of raw water parameters. Treatment choices should be based on worst case data. See also the checklists below.

Types of POU Treatment

There are currently two types of POU treatment approved by EPA for use in systems serving fewer than 10,000 customers. These are ion exchange, and reverse osmosis. The following table lists the treatment types and the contaminants for which they are approved. The bolded contaminants are those that are known to occur in Idaho and which are likely to be the best candidates for POU treatment.

POU Treatment	Contaminants
Ion Exchange (IX)	Lead, **Arsenic**, Barium, Beryllium, Cadmium, Chromium, Copper, Thallium
Reverse Osmosis (RO)	Antimony, Lead, **Arsenic**, Barium, Beryllium, Cadmium, Chromium, Copper, **Flouride**, Selenium, **Nitrate***

* EPA has <u>not</u> listed POU as acceptable technology for treatment of nitrate. Idaho DEQ will consider POU for nitrate only in limited circumstances, as outlined under "Types of Water Systems" on pages 8 and 9.

Ion exchange passes water through a bed of selective resins which exchanges contaminant ions for harmless ions. Anion exchange selects for negatively charged ions, such as nitrate and sulfate. Cation exchange selects for positively charged ions. The latter mechanism is the type used in household water softeners. When the resin has become saturated with contaminant ions, it is recharged by backwashing with a concentrated solution that replaces the absorbed contaminants with harmless ions. The brine solution used in backwashing is normally drained through an air gap to a sanitary sewer or subsurface sewage treatment system. However, acid solutions used in anionic systems may not be suitable for direct discharge to sewers.

Reverse osmosis uses a semi-permeable membrane to allow passage of water while blocking the passage of contaminants. Adequate system pressure is necessary in order to force the water to move against a concentration gradient (it is this reversal of the natural osmotic gradient that gives the process its name). From one-third to half or more of the water forced against the membrane is rejected to waste. This low recovery rate makes centralized or POE treatment with RO quite expensive. In addition, RO-treated water is corrosive and usually requires pH adjustment prior to distribution. POU treatment may be a more practical application of RO technology because only a small stream of water intended for drinking and cooking is ordinarily treated. A typical POU installation will have a 5 micron cartridge prefilter to remove particulate, the RO unit itself, which is plumbed to treat a bypass flow from a cold water tap, a granular activated carbon post-filter to improve the flavor of the finished water, and a storage tank of 1.5-3.0 gallons capacity to ensure that water is available on demand. This treatment train serves a dedicated tap, which will often be the only potable water source at a service connection. The reject water from the influent side of the RO unit must be plumbed to the sewer drain with an air gap to prevent backflow. All of this can usually be installed beneath the sink in a household kitchen. If post-treatment components are made of appropriate materials, the corrosive RO-treated water will not require pH adjustment prior to consumption.

Technical Checklists

As mentioned in the introduction, the burden of demonstrating feasibility rests with the water system and its consulting engineer, where one is employed. Preparation of a POU application by an engineer will be standard practice for all but the smallest of systems, and even in these instances DEQ reserves the option of requiring an engineering report. DEQ reviewers will need to check the submitted materials for technical accuracy and satisfy themselves that managed POU treatment will work for the system. The following checklists are provided to assist in both the preparation and review of a POU submittal. The checklists are not all-inclusive, but they do address some of the key factors to be considered in POU treatment.

Checklist 1--Reverse Osmosis Applications

- **Raw Water Chemistry:** Include analysis of all inorganic constituents that have an identifiable importance to the specific treatment device being considered. Manufacturers will ordinarily specify the raw water attributes that must be characterized. Report total dissolved solids (TDS) and pH. TDS > 1000 PPM can limit membrane effectiveness and longevity. Pre-softening of such waters may be required. pH may effect dielectric relationships at the membrane pores.

- **Membrane Type:** Cellulose acetate membranes (CAMs) and thin film membranes (TFPs) are the common types. Most RO applications use TFPs because of superior contaminant removal rates at wide temperature and pH ranges and at lower system pressure. Pressures below 20 pounds/sq. in. will result in unacceptable performance. 40-60 pounds of pressure is a suitable operating range for RO.

- **Capacity:** Typical household POU units will treat 8-15 gallons per day, depending on system pressure and water chemistry. Consumers will need to use water judiciously. Use of automatic icemakers may not be practical, or may require treatment units with larger capacity. Businesses will probably need multiple units or larger units (See Section 3 of these guidelines for discussion of management issues).

- **Installation:** Licensed plumber or qualified vendor personnel. DEQ will consider installation by system personnel if adequate training is provided by the equipment supplier.

- **Operating and Maintenance:** In a typical under-sink installation, initial filter and membrane replacement intervals will be developed from analysis of water chemistry and results of the pilot study. A written O&M plan is required. The water system may contract with a third party to perform this service. See Section 3 for management considerations.

- **Insurance:** Water systems have been held responsible for damages to residences incurred during installation or as a result of leaks. Adequate liability insurance should be included in the engineering study and cost analysis.

- **National Certifications:** ANSI/NSF Standard 58 applies to RO treatment systems. ANSI/NSF Standard 53 (health effects) also applies.

- **Warning Devices:** For RO applications, the best alarm device is an in-line TDS meter. When breakthrough at the membrane occurs, TDS in the treated water will increase sharply. This can be used to actuate a warning light. The alarm mechanism must be checked for functionality and calibrated at each scheduled maintenance. For nitrate applications, the TDS meter should actuate a shut-off valve to prevent ingestion of untreated water by infants.

- **Waste Streams:** Impacts of waste streams from POU units will generally be minimal. However, in larger communities the effect of these streams may need to be considered in terms of their impact on the operation of central sewage facilities. The engineering report should estimate the volume of the total waste stream and its contaminant load. This can be based on pilot study data regarding reject and treated water volumes and percent removal of source water contaminants. Businesses such as restaurants or others with large demands for potable water may require special consideration of waste impacts, especially if subsurface sewage disposal is practiced.

- **Disinfection:** Water delivered to the point of use device should ordinarily be thoroughly disinfected to prevent pathogens from entering the POU treatment train. Water systems with a record of high bacteriological quality may wish to pilot the POU equipment without disinfection and conduct evaluations of bacterial colonization in the treatment train. Disinfection is not mandatory, but may be required if bacterial problems arise after installation. The engineering study must consider this contingency. In systems that disinfect with chlorine, the residual should not be excessive or it may attack the membrane and result in impaired treatment efficiency and reduced lifespan. A carbon pre-filter may be needed. See Section 3 for a discussion of risks associated with bacterial quality in POU-treated water.

Checklist 2—Ion Exchange Applications

- ❑ **Raw Water Chemistry:** The raw water should be characterized for inorganic constituents and other attributes pertinent to the treatment equipment being considered. As with RO systems, the manufacturer will ordinarily specify the scope of the raw water chemical analysis that is need to determine the suitability of various treatment options. Competition among ions for exchange sites on the resin can seriously impact the efficiency with which the contaminant(s) of concern are removed. Manufacturers will have ion selectivity sequences for the resins in their products. Some waters may not lend themselves to IX treatment without prior softening. Magnesium, copper, and iron can foul IX equipment.

- ❑ **Resin Type:** Cation exchange is effective in removing barium, cadmium, copper, zinc, manganese, chromium III, iron II, lead, mercury, and radium. The sodium chloride (salt) solution used to backwash these devices is not harmful to sewage facilities. Anion exchange is effective at removing nitrate, bicarbonate, arsenic, chromium, selenium, sulfate, and chloride. Anion exchange units are backwashed with an acid solution. Handling and storage of the acid and disposal of the backwash solution can be problematic.

- ❑ **Capacity:** IX units are capable of treating larger volumes of water than RO devices. However, the size of the resin tank and other components is the limiting factor. In general, IX is viewed as being more suited to point of entry treatment, but cost and waste disposal issues have prevented EPA from recommending POE applications for small systems at the present time.

- ❑ **Installation:** A licensed plumber, vendor personnel, or adequately trained system personnel can install this equipment. The system or its consulting engineer must consider local or state plumbing codes. Waste backwash solutions must be discharged to the sewer through an air gap to prevent backflow

- ❑ **Operation and Maintenance:** Units must be checked on a regular schedule to insure that mineral fouling or bacterial colonization is not occurring. Salt or acid supplies must be regularly replenished. The timing of maintenance activities will be determined during pilot studies.

- ❑ **Insurance:** Liability and damage insurance must be maintained by the water system to cover losses to homeowners due to leaks or installation and maintenance activities.

- ❑ **National Certifications:** ANSI/NSF Standard 53 (health effects). ANSI/NSF Standard 44 applies to ion-exchange systems.

- **Warning Devices:** A flow meter which shuts off the water supply after a pre-determined amount of water has been treated is an effective alarm mechanism for ion exchange systems. The amount of water that can be treated before the unit must be serviced is determined during the pilot study. A safety factor is built into the flow meter shut-off setting. Alarm devices must be checked for proper function and calibrated or repaired as necessary at each scheduled service.

- **Waste Streams:** Not usually an issue with POU applications. Anion exchange devices, if proposed, will require an analysis of waste volumes and impacts.

- **Disinfection:** Water delivered to the treatment device will ordinarily require disinfection to prevent bacterial colonization or fouling of the treatment train.

This page intentionally left blank.

Section 3. Management Considerations

The traditional model for water treatment in public systems involves a central treatment facility that treats all water sent into the distribution system for delivery to customers. The treatment plant is under the supervision and control of skilled operators who optimize treatment processes and observe rigid safety standards.

POU treatment departs radically from the traditional model. It distributes the treatment plant throughout the service area of the water system. It treats only a small portion of the customers' water, leaving the remainder untreated and potentially available to residents who may be unaware of the treatment strategy or simply forgetful. The unique risks and drawbacks associated with POU treatment have been emphasized in the introduction to this document.

In this Section, information will be provided to aid in designing a *managed* POU treatment strategy. The water system and its customers must form a partnership to ensure that people in the service area do not ingest untreated water. This involves a process of educating the community and then reinforcing that learning on a perpetual basis. It also involves regular and careful maintenance of the treatment devices to ensure that they do not fail.

Health Risks

In the technical section of these guidelines, it was suggested that arsenic, flouride, and nitrate are the drinking water contaminants that are known to occur in Idaho and are likely candidates for point of use treatment. Nitrate is a special case and is discussed below. When arsenic and flouride exist in drinking water in quantities exceeding the maximum contaminant level (MCL), they pose a *chronic risk* to those who drink the water. The MCL for flouride is 4.0 mg./l and for arsenic it is currently .05 mg/l. The new arsenic rule will reduce this figure to .010 mg/L in 2006. Chronic contaminants at or greater than MCL concentrations can cause serious health consequences when ingested over a lifetime. Arsenic may cause skin damage, circulatory problems, and increased risk of cancer. Flouride may cause skeletal flourosis, a condition characterized by tenderness and pain in the bones. Children may experience mottling of their teeth.

Consuming a small amount of this water on an accidental or occasional basis will not be likely to cause harm. Under these conditions, a POU application may be a good solution to what otherwise could be an expensive treatment problem for a small water system. However, as concentrations of these contaminants increase significantly above the MCL, central treatment or provision of an alternative source of water are better solutions.

The nitrate MCL is set at 10 mg./l, a level that is protective of infants. Nitrate is converted to nitrite in the body and can inhibit the oxygen carrying capacity of the blood, resulting in a potentially fatal disorder known as "blue baby syndrome", or methemoglobinemia. There is some evidence that consumption of water containing nitrate above the MCL by pregnant women may pose a risk to the developing fetus. Because nitrate is a potentially acute contaminant to infants, the risk associated with accidental ingestion of untreated water is much higher than it is for arsenic and fluoride. Recent national guidance recommends against POU for nitrate treatment (see references on page 21). There is even a possibility that future regulations will actually prohibit POU as a compliance strategy for nitrate. POU will only be allowed in limited circumstances (see pages 8 and 9). Qualifying water systems that choose to pursue a POU treatment strategy are advised to remain abreast of national regulatory actions in respect to nitrate. In most cases, POE will be a superior choice for nitrate compliance if central treatment proves impractical.

Affordability

As a rule of thumb, costs for water in a community should fall between 1.5 and 2% of median household income. Obviously, a community may be willing (or may be required) to pay more than this if it has poor quality water that requires expensive treatment. Although central treatment is generally preferred because of safety and liability concerns, the capital and operating costs of this type of treatment may be beyond the reach of a small system. It may be difficult for a small system to attract and retain a qualified operator for a central treatment facility. Waste disposal may be expensive, particularly in isolated communities. Large quantities of water destined only for irrigation use must be treated to potable standards. These and other, similar challenges connected with central treatment will probably lead to increased interest in POU applications in small systems.

County level data on numbers of persons per household, per person income, and other demographic and economic factors that may be useful in a feasibility analysis are available from the Idaho Department of Commerce website:
www.idoc.state.id.us/idcomm/cntypro.html

Operation and Maintenance

As outlined in the regulatory background on page 5, the water system retains ownership of the POU treatment devices and is responsible for their routine maintenance as well as for the quality of water delivered by each unit. The following points may be useful when determining how to design and manage an O & M strategy:

1. Vendors of POU equipment may be interested in contracting for the routine service and repair of their products. This would be a favorable arrangement for small water systems that may lack qualified personnel.

2. Most service will need to be performed during evenings and weekends, since many people are not at home during normal weekday business hours. This could become a demoralizing factor for those charged with the maintenance task. It has the potential to add substantially to the cost of any service contract that may be negotiated, and it may make it difficult for a system to attract and maintain a qualified operator.

3. The customer must become a partner with the water system in detecting leaks, noting the status of the alarm device, and promptly communicating any other problems that may be encountered. This requires a perennial outreach activity that can be costly and demanding. Costs associated with public outreach are an important component of the feasibility analysis.

Microbial Concerns

If influent water is disinfected, problems with microbial build-up in the POU treatment train are likely to be minimal. However, due to the ubiquitous presence of bacteria in the environment, it will usually be difficult or impossible to avoid bacterial colonization of the treatment train over time. A granular activated carbon filter is probably the system component most susceptible to bacterial growth, since carbon serves as an energy source for many of these organisms. A GAC filter may be used prior to a RO unit to remove chlorine (as protection for the membrane) and again after treatment to polish the finished water. Several scientific studies have demonstrated that the types of bacteria that grow in GAC filters are not harmful to healthy persons, *provided that the water arriving at the treatment device does not contain pathogenic organisms*. If GAC filters are changed on a frequent basis, bacterial populations will not have time to build up to significant levels. Periods when water temperatures are warm would pose the greatest risk of microbial growth. Again, the key factor seems to be that the influent water must be of high microbiological quality. Post-treatment UV disinfection could be provided to reduce the risk of microbial contamination, but this has not usually been necessary with POU applications.

Compliance Monitoring

Systems will continue to be required to monitor for coliform bacteria at locations representative of water quality in the distribution system (not all coliform compliance samples need to be taken at taps serviced by POU devices—some may also be taken from untreated locations). In addition, systems may wish to periodically sample for heterotrophic bacteria in POU-treated water to determine if filters are being changed frequently enough. Samples for compliance with regulated chemical contaminants should be taken at the time of scheduled maintenance, but prior to servicing the treatment unit. Regional and State Office staff will need to consult on the chemical monitoring scheme for each individual water system until enough experience has accumulated to make it possible to take a standardized approach. In theory, there should be no samples that exceed the MCL, because the POU devices must be equipped with an alarm device to signal treatment failure. See the technical checklists in Section 2.

Businesses and Other High Usage Connections

Communities that have the legal authority to pass ordinances have sometimes required businesses and other service connections that require larger quantities of potable water to purchase their own treatment devices. The water system specifies the equipment and retains ownership and responsibility for maintenance. Waste management can become a significant issue in these circumstances. If a community is of sufficient size to have a fair number of high usage connections, it is likely that the financial feasibility of central treatment will improve to the point that POU strategies will be rejected.

Advantages of POU Treatment for Small Systems

These guidelines have emphasized the limitations and disadvantages of POU treatment because these factors are crucial to the development of a safe and effective treatment strategy. Once these matters have been effectively considered, it may be encouraging to weigh some of the benefits associated with POU treatment:

1. It is not necessary to treat large volumes of irrigation water, which make up about 95% of the water delivered to customers in a typical water system.

2. Waste liquids or solids are produced in small quantities and usually may be disposed of in sewage treatment systems. Central treatment, by contrast, often produces a significant volume of waste sludges or brines which must be disposed of at considerable expense.

3. Involvement of the consumer in water treatment issues will, over time, foster a customer base made up of educated and involved people. This has the potential to make managing system operations and finances a much simpler task.

4. POU treatment is likely to encourage conservative use of potable water, in that the quantities produced by most home scale devices are quite limited.

Reporting and Recordkeeping

DEQ will expect water systems using POU treatment to maintain records of maintenance activities, public outreach, and costs of service. An annual summary of costs and performance data for the POU strategy should be available for inspection on request. Systems may wish to contract with their design engineer to prepare this annual summary.

Concluding Remarks

POU or POE can be effective treatment strategies for small systems. Reverse osmosis treatment for nitrate, arsenic, or flouride is likely to be the most common POU choice in Idaho at the present time. The management challenges associated with POU treatment are significant and must be considered by the water system on the same level of importance as technical issues. DEQ welcomes comment on these guidelines from consultants, water systems, and other users. These guidelines will be revised as regulatory and technological changes occur.

References

Lykins, B.W. Jr., Clark, R.M., and Goodrich, J. A. *Point-of-use/Point-of-entry for Drinking Water Treatment.* Lewis Publishers, Ann Arbor, MI. 1992.

USEPA, 1998. *Cost Evaluation of Small System Compliance Options: Point of Use and Point-of-Entry Treatment Units.* Prepared by The Cadmus Group, Waltham, MA.

USEPA, 1998. *Small System Compliance Technology List for the Non-Microbial Contaminants Regulated before 1996.* EPA 815-R-98-002.

USEPA, 2002. *Guidance for Implementing a Point-of-Use or Point-of-Entry Treatment Strategy for Compliance with the Safe Drinking Water Act --Revised Final Draft—* (Note: This document may be downloaded from the Internet at: http://www.epa.gov/safewater/standard/pou.pdf. Presumably, EPA will post the final version at the same address.)